CLAIMS

What is claimed is:

1. A method for establishing a restoration path for a service in a mesh network having a plurality of nodes interconnected by a plurality of links, the method comprising, at a regional manager for one or more transit nodes of the restoration path:

receiving a service data structure comprising an identification of each link and transit node in a primary path for the service; and

determining whether to reserve additional protection bandwidth, on an outgoing link incident to at least one of the one or more transit nodes of the restoration path, using the service data structure, wherein the outgoing link is part of the restoration path.

2. The invention of claim 1, further comprising receiving, at the regional manager, identification of the service, identification of the outgoing link, and bandwidth of the service.

3. The invention of claim 1, further comprising reserving the additional protection bandwidth on the outgoing link, if the regional manager determines that any additional protection bandwidth is required.

4. The invention of claim 3, further comprising transmitting from the regional manager information about the additional protection bandwidth for communication to each other node in the network.

5. The invention of claim 1, wherein:

the service data structure is a primary path vector having a plurality of entries corresponding to the nodes and links in the network; and

each entry of the primary path vector identifies whether the corresponding node or link is part of the primary path for the service.

6. The invention of claim 5, wherein the primary path vector is a primary path node-link vector V_{pnl}.

7. The invention of claim 1, wherein the network is a mesh data network that transmits packetized data.

8. The invention of claim 1I, wherein:

5   the regional manager has a network data structure comprising, for each link in the network and each node or other link in the network, a representation of a minimum amount of protection bandwidth required to be reserved on said each link to restore service upon failure of said node or other link;

        the regional manager determines, using the network and service data structures, whether
10   the service requires the additional protection bandwidth to be reserved on the outgoing link of the transit node of the restoration path; and

        the regional manager updates the network data structure if any additional protection bandwidth is determined to be required for the service on the outgoing link .

15   9. The invention of claim 8, wherein:

        the network data structure is an array of vectors, wherein:

            each vector in the array corresponds to a different link in the network;

            each vector in the array has a plurality of entries corresponding to the nodes and links in the network;

20   for a vector corresponding to the outgoing link, each entry in the vector corresponding to a node or other link identifies the minimum amount of protection bandwidth required to be reserved on the outgoing link to restore service upon failure of the node or other link; and

        the service data structure is a primary path vector having a plurality of entries
25   corresponding to the nodes and links in the network, wherein:

            each entry of the primary path vector identifies whether the corresponding node or link is part of the primary path for the service.

        10. The invention of claim 9, wherein the regional manager determines whether the
30   service requires any additional protection bandwidth to be reserved on the outgoing link by applying a vector addition operation between the primary path vector corresponding to the service and the vector of the array corresponding to the outgoing link.

11. The invention of claim 10, wherein the vector addition operation comprises addition of corresponding vector entries, wherein the additional protection bandwidth is required if any vector entry sum exceeds a reserved bandwidth on the link.

5   12. The invention of claim 1, wherein the receiving of a service data structure comprises supporting a signaling protocol interface.

13. The invention of claim 12, wherein the signaling protocol is reservation protocol with traffic engineering extensions (RSVP-TE).

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14. A regional manager in a mesh network having a plurality of nodes interconnected by a plurality of links, wherein:

the regional manager manages one or more transit nodes of a restoration path for a service in the mesh network; and

15   the regional manager is adapted to:

receive a service data structure comprising an identification of each link and transit node in a primary path for the service; and

determine whether to reserve additional protection bandwidth, on an outgoing link incident to at least one of the one or more transit nodes, using the service data structure,

20   wherein the outgoing link is part of the restoration path.

15. The invention of claim 14, wherein the regional manager is further adapted to receive identification of the service, identification of the outgoing link, and bandwidth of the service.

25   16. The invention of claim 14, wherein the regional manager is further adapted to reserve the additional protection bandwidth on the outgoing link, if the regional manager determines that any additional protection bandwidth is required.

17. The invention of claim 16, wherein the regional manager is further adapted to

30   transmit information about the additional protection bandwidth for communication to each other node in the network.

18. The invention of claim 14, wherein:

the service data structure is a primary path vector having a plurality of entries corresponding to the nodes and links in the network; and

each entry of the primary path vector identifies whether the corresponding node or link is part of the primary path for the service.

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19. The invention of claim 18, wherein the primary path vector is a primary path node-link vector V_{pnl}.

20. The invention of claim 14, wherein the network is a mesh virtual-circuit data network that transmits packetized data.

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